METHYL BROMIDE CRITICAL USE RENOMINATION FOR POST-HARVEST -- DRY CURED PORK PRODUCTS

NOMINATING PARTY: The United States of America

FILE NAME USA CUN14 **POST HARVEST -- DRY, CURED PORK PRODUCTS**

BRIEF DESCRIPTIVE TITLE OF NOMINATION:

Methyl Bromide Critical Use Nomination for Post Harvest Use on Dry Cured Pork Products (Submitted in 2011 for 2014 Use Season)

STRUCTURE, COMMODITY OR OBJECT TREATED:

This sector is for the production of cured meat products, such as country hams. These are produced primarily in the southern U.S. This sector has no known viable alternative currently available.

QUANTITY OF METHYL BROMIDE REQUESTED IN EACH YEAR OF NOMINATION:

TABLE 1: QUANTITY OF METHYL BROMIDE REQUESTED IN EACH YEAR OF NOMINATION

YEAR	NOMINATION AMOUNT (KILOGRAMS)
2014	**3,730 kg**

(Details on this page are requested under Decision Ex. I/4(7), for posting on the Ozone Secretariat website under Decision Ex. I/4(8).)

In assessing nominations submitted in this format, TEAP and MBTOC will also refer to the original nomination on which the Party's first-year exemption was approved, as well as any supplementary information provided by the Party in relation to that original nomination. As this earlier information is retained by MBTOC, a Party need not re-submit that earlier information.

NOMINATING PARTY CONTACT DETAILS:

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Following the requirements of Decision IX/6 paragraph (a)(1) United States of America has determined that the specific use detailed in this Critical Use Nomination is critical because the lack of availability of methyl bromide for this use would result in a significant market disruption. ■ *Yes* ☐ *No*

Signature Name Date

Title: _____

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LIST OF DOCUMENTS SENT TO THE OZONE SECRETARIAT IN OFFICIAL NOMINATION PACKAGE:

1. PAPER DOCUMENTS: Title of paper documents and appendices	**No. of pages**	**Date sent to Ozone Secretariat**
2. ELECTRONIC COPIES OF ALL PAPER DOCUMENTS: *Title of each electronic file (for naming convention see notes above)	**No. of kilobytes**	**Date sent to Ozone Secretariat**
USA CUN14 Post Harvest Ham		

* Identical to paper documents

METHYL BROMIDE CRITICAL USE RENOMINATION FOR POST-HARVEST -- DRY CURED PORK PRODUCTS

1. SUMMARY OF NEED FOR METHYL BROMIDE AS A CRITICAL USE

Currently there are no viable alternatives to methyl bromide for the dried meat industry: heat would alter the product, and phosphine has failed to control mites, a major pest. Sulfuryl fluoride received federal registration and has been tested for efficacy against the mites and other pests of cured meat products. Although mortality of the red-legged ham beetle occurred at levels below maximum rates of sulfuryl fluoride, the same cannot be said for the ham mites (Phillips, et al., 2008). Control of the ham mites took three times the legal limits of sulfuryl fluoride (Phillips, et al., 2008). At the time of this nomination, there are no known registered alternatives for use on hams in the U.S. that provide the same level of mite control as methyl bromide.

This industry is cooperating with university researchers to find technically and economically feasible alternatives to methyl bromide. Dry, cured pork producers no longer fumigate with methyl bromide on a monthly schedule, but monitor and fumigate when pests are detected. Many producers use pheromone traps to monitor for pests (Arthur and Phillips, 2003). Producers improved sanitation in their curing facilities. Producers have modified their buildings to make them more gas-tight, not only to try to exclude pests, but also to retain methyl bromide better. Some companies eliminated grass, trees, and shrubs from their buildings and replacing them with gravel, as suggested by researchers in 2008, to reduced harborage for pests outside their aging houses. These efforts have reduced their use of methyl bromide, but have not eliminated the need to disinfest their dry, cured pork products.

This industry currently has no viable chemical or non-chemical alternative available. Although some measures, listed in the above paragraph, have reduced the number of times fumigation is needed in some facilities, it has not eliminated the need for fumigation. Therefore, methyl bromide remains critical to this industry.

TABLE 2. NOMINATION AMOUNT

2014 Methyl Bromide Usage Newer Numerical Index (BUNNI) Transition Use Reduction Description Spreadsheet						
SECTOR		**HAM**				
		Gwaltney of Smithfield	**National Country Ham Association**	**Nahunta Pork Center**	**American Assoc. of Meat Processors**	**Sector Total**
Quantity Requested for 2013:	Amount (kgs)	726	709	91	2,204	3,730
Quantity Recommended by MBTOC/TEAP for 2013 :	Amount (kgs)	726	709	91	2,204	3,730
Quantity Approved by Parties for 2013:	Amount (kgs)	726	709	91	2,204	3,730
	Volume (1000 m^3)	56	42	5	110	-
	Rate	13	17	18	20	-
Transition from 2014 Baseline Adjusted Value	Percentage (%)	0%	0%	0%	0%	-
Quantity Required for 2014 Nomination:	Amount (kgs)	**726**	**709**	**91**	**2,204**	**3,730**
	Volume (1000 m^3)	**56**	**42**	**5.1**	**110**	**-**
	Rate	**13**	**17**	**18**	**20**	**-**

2. SUMMARIZE WHY ALTERNATIVES ARE NOT FEASIBLE

This industry currently has no viable chemical or non-chemical alternative available. Although its IPM measures has reduced the number of times fumigation is needed, it has not eliminated the need for fumigation. Therefore, methyl bromide remains critical to this industry.

3. UPDATE OF RESEARCH RESULTS SHOWING EFFICACY OF ALTERNATIVES

Researchers are actively investigating the control of arthropod pests that infest dry cured pork products during the aging process.

Research Results

Fumigation trials were conducted in May, October, and November 2011 in 1000-cubic meter shipping containers intended to simulate dry cured aging ham houses at phosphine concentrations ranging between 1000-2000 ppm and exposure times of 48 or more hours. Temperature was measured in the ham houses during fumigation and twenty *Tyrophagus putrescentiae* (ham mites) bioassay jars and ten *Necrobia rufipes* (red-legged ham beetles) jars were placed in each shipping container for each trial. Ten dry cured hams were hung from racks in shipping containers to simulate dry cured aging conditions. Five of these hams were used for mite inoculation and the other 5 hams were used for sensory analysis and phosphine residue testing. The lean portion of the dry cured hams (that were used for inoculation) was also inoculated with a mixed culture of approximately 1000 mites. Phosphine gas was produced in the shipping containers using magnesium phosphide cells that reached target fumigation doses at

between 8 to 12 hours after the fumigation was started. Phosphine concentration was measured in the shipping containers using both Dräger tubes and a calibrated UV-VIS detector.

The post-embryonic mite mortality was 99.8% in the bioassays at two weeks post fumigation when 2000 ppm phosphine was achieved, but the eggs on either the hams or in the bioassays were not controlled, even at concentrations as great as 2000 ppm. The next phase of the study will be to fumigate in spring 2012 at 2000 ppm for 72 hours to determine if greater control of ham mite eggs can be reached with a longer exposure time when the temperature is greater than 20^{o} C. A trial fumigation of 72 hrs in November 2011 had been planned; however, the ambient temperature was already too cold ($<15^{o}$ C) to achieve successful control of ham mites in this follow up trial. (Schilling & Phillips, personal communication)

Earlier investigations presented at 2010 MBAO, demonstrated that at temperatures of 20^{o} C or greater, all life stages of *Necrobia rufipes* (red legged ham) beetles were controlled in all phosphine fumigation trials. Variations in test conditions indicated that temperatures and exposure times need to be optimized for fumigation since 48 hours was not long enough to control ham mites at 2000 ppm and ambient temperatures below 15^{o} C decreased the effectiveness of the fumigation against both ham mites and red legged beetles. Sensory tests indicated that trained panelists could not determine differences between phosphine treated dry cured hams and non-fumigated hams. In addition, residual phosphine concentrations were below the legal limit of 0.01 ppm in ham slices that were taken from phosphine fumigated hams. Thus maintenance of post-treatment market quality and food safety support continued research on efficacy of phosphine fumigation for hams. (Phillips, et al. 2008)

Previous USG nominations described the failure of sulfuryl fluoride, carbon dioxide, and ozone to control ham mites and red legged ham beetles. USG previously reported the results of low pressure and low oxygen concentrations on ham mites under laboratory settings, which took too long to be a viable option at this time.

There is still no technical alternative for methyl bromide for the dry cured ham industry at this point in time. Research is still ongoing with phosphine, but more research and commercial applications need to be conducted before any treatment can be considered an alternative to methyl bromide for treatment of ham (mold) mites.

Funding

In the spring of 2007, a proposal was submitted to the USDA Integrated Research, Education, and Extension Competitive Grants Program- Methyl Bromide Transitions (CSREES-MBT) by several meat scientists and one entomologist. A no-cost extension was granted for 2010-2011, and additional funding has been provided through the Southern Regions Integrated Pest Management Center to continue research efforts for 2010 and 2011.

The researchers successfully competed for a USDA-MBT grant to support their investigations. The new funding is for 2011-2013, with a potential no-cost extension into 2014. This research will start in January 2012 and is a collaborative effort between Mississippi State University, Kansas State University, and Oklahoma State University. In addition, all the research projects

are being conducted in conjunction with the National Country Ham Association, The American Association of Meat Processors, individual ham producers, and fumigant companies.

4. REGISTRATION UPDATE

No new chemicals have been registered or de-registered since the last nomination.

5. ECONOMIC INFEASIBILITY OF ALTERNATIVES

An economic analysis was not conducted because this sector has no technically feasible alternatives at this time.

CITATIONS

Phillips, T.W. Hasan, M.M., Aikens, M.J., Schilling, M.W. 2008. Efficacy of sulfuryl fluoride to control ham mites and red-legged ham beetles. Annual International Research Conference on Methyl Bromide Alternatives and Emission Reduction, Orlando, FL, November 11th-14th

Schilling, W. and T. W. Phillips, 2011. Personal Communication.